

No.

200100093



# THE UNITED STATES OF AMERICA

**TO ALL TO WHOM THESE PRESENTS SHALL COME:**

State of Oregon by/through S. J. H. acting  
on behalf of Oregon State University

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC DEPOSITMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE APPLICANT(S) SHALL EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR PROPAGATING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE FOREGOING PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED IN THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

POTATO

'Winema'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this seventeenth day of September, in the year two thousand and seven.

Attest:

Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service



REPRODUCE LOCALLY. Include form number and date on all reproductions

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICEAPPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE  
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME State of Oregon by/through STBHE acting on behalf of Oregon State University LMC 7-16-01 LMB 7-2-2007 per correspondence May 29, 2007 her Education on		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME ND02438-6R		3. VARIETY NAME Winema	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Office of Technology Transfer Oregon State University 312 Kerr Administration Building Corvallis, OR 97331		5. TELEPHONE (Include area code) 541.737-0674		FOR OFFICIAL USE ONLY #2 00100093	
6. FAX (Include area code) 541.737-3093		7. IF THE OWNER NAMED IS NOT A "PERSON". GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Educational Institution		8. IF INCORPORATED, GIVE STATE OF INCORPORATION	
9. DATE OF INCORPORATION		10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers)  Office of Technology Transfer c/o Sarah Mabee Oregon State University A312 Kerr Administration Bldg Corvallis, OR 97331-2140 USA  per request June 11, 2007 LMC 7-16-2007		FILING AND EXAMINATION FEES: \$ 2,705.00 DATE 02/02/01 CERTIFICATION FEE: \$ 768.00 DATE 8/13/2007	
11. TELEPHONE (Include area code) 541-737-8100		12. FAX (Include area code) 541-737-3093		13. E-MAIL Sarah.Mabee@oregonstat.edu	
14. CROP KIND (Common Name)		18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) \$ 2,705 g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,450), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act. <input checked="" type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input checked="" type="checkbox"/> NO (If "no", go to item 22) LMC 7-2-01 per application form	
20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED		21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? IF YES, SPECIFY THE NUMBER 1, 2, 3, etc. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)		22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)	
23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)		24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF OWNER  William Hostetter		SIGNATURE OF OWNER			
NAME (Please print or type) William Hostetter		NAME (Please print or type)			
CAPACITY OR TITLE Director of Technology Transfer		DATE 1/31/01		CAPACITY OR TITLE DATE	

**GENERAL INSTRUCTIONS:** To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E, F; (3) for a tuber reproduced variety, verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; and (4) payment by credit card or check drawn on a U.S. bank for \$4,382 (\$518 filing fee and \$3,864 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice). **NEW:** With the application for a seed reproduced variety or by direct deposit soon after filing, the applicant must provide at least 3,000 viable untreated seeds of the variety *per se*, and for a hybrid variety at least 3,000 untreated seeds of each line necessary to reproduce the variety. Partial applications will be held in the PVPO for not more than 90 days; then returned to the applicant as un-filed. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. **Retain one copy for your files.** All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a payment by credit card or check payable to "Treasurer of the United States" in the amount of \$768 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**NOTES:** It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

**Plant Variety Protection Office**  
**Telephone:** (301) 504-5518 **FAX:** (301) 504-5291  
**General E-mail:** PVPOmail@usda.gov  
**Homepage:** <http://www.ams.usda.gov/science/pvpo/PVPindex.htm>

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#### **SPECIFIC INSTRUCTIONS:**

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and **provide evidence** that the permanent name of the application variety (even if it is a parental, inbred line) has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: U.S. Department of Agriculture, Agricultural Marketing Service, Livestock and Seed Programs, **Seed Regulatory and Testing Branch**, 801 Summit Crossing Place, Suite C, Gastonia, North Carolina 28054-2193 Telephone: (704) 810-8870.  
<http://www.ams.usda.gov/lsg/seed.htm>.

#### **ITEM**

- 19a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;  
(2) the details of subsequent stages of selection and multiplication;  
(3) evidence of uniformity and stability; and  
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:  
(1) identify these varieties and state all differences objectively;  
(2) attach replicated statistical data for characters expressed numerically and demonstrate that these are clear differences; and  
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

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**22. CONTINUED FROM FRONT** (Please provide a statement as to the limitation and sequence of generations that may be certified.)

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**23. CONTINUED FROM FRONT** (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

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**24. CONTINUED FROM FRONT** (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

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According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

## **Exhibit A: Origin and Breeding History of the Variety**

Winema was initially selected by Oregon State University Agriculture Experiment Station scientists at the Klamath Experiment Station, Klamath Falls, Oregon, in 1989 from a cross between 1196-2R and Redsen performed by Dr. Robert Johansen of North Dakota State University, Fargo, North Dakota.

It was then tested extensively as NDO2438-6R (ND=North Dakota cross, and O=Oregon selection) in preliminary tests at Klamath Falls and Corvallis, Oregon, and at Tulelake and Bakersfield, California, from 1990 to 1993. Formal evaluation of NDO2438-6R in Western Regional red-skinned trials occurred at eight locations in six western states in 1994, 1995, and 1997. The Oregon State University Potato Variety Development Program, led by Dr. Alvin R. Mosley, and Oregon State University sponsored NDO2438-6R in all trials and supplied all seed. Winema was released in 2000 by Oregon State University, in cooperation with North Dakota, California, Idaho, and Washington.

The stable and uniform characteristics of the subject variety, discussed elsewhere herein, were observed annually over the time interval from at least 1989 to 1997. These observations occurred in Oregon, California, and/or Western Regional Trials.

### **Breeding History:**

Winema was selected from a cross between Redsen (female parent) and ND1196-2R (male parent); the attached pedigree chart shows the parental lineage for three previous generations.

### **Variants:**

At this point, no predictable variants have been specifically identified, though it is expected that variants will occur in the future. Most potato varieties eventually produce mutant plants known as "giant hills," "bolters," or "bull plants." It is expected that these plants will be found in Winema at a very low frequency.

### **Selection Criteria:**

Selection criteria for Winema included tuber skin and flesh color (red skin, white flesh), small tuber size, tuber uniformity, roundness/smoothness, shallow eyes, high marketable yield, and overall performance relative to leading red potato varieties (e.g., Red LaSoda and Dark Red Norland).

### **Breeding Method:**

A traditional breeding process was used. Male and female parents were crossed, followed by planting the seed produced, generating minitubers, and subsequent selection based on established criteria. Approximately 150 crosses were made, and three fruit from each cross (approximately 200 seeds/fruit) were planted. Seedlings were grown in a greenhouse, and greenhouse-produced tubers were field-planted. Winema was line selected from these plantings.

### **Difference from Original Material:**

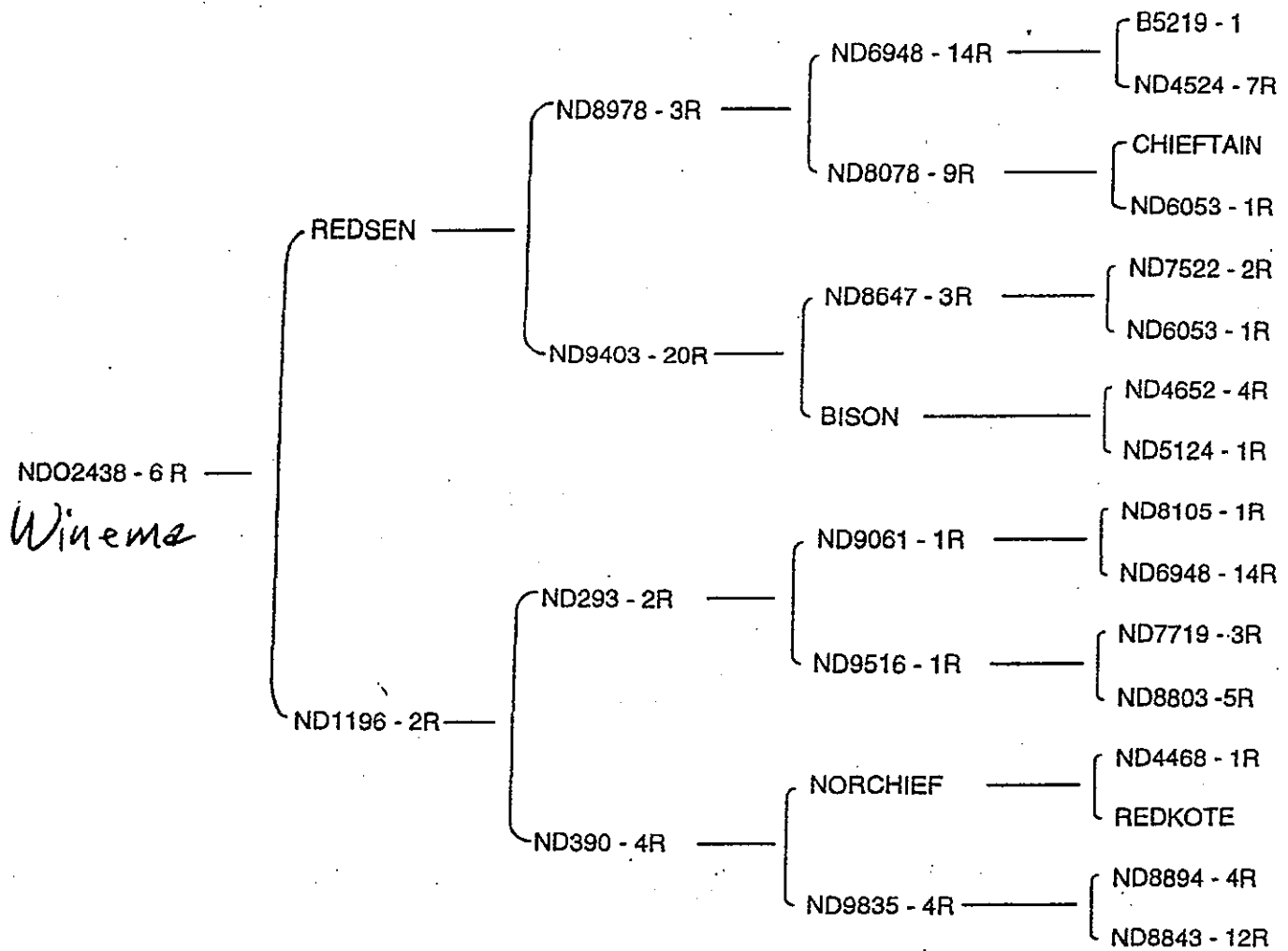
Winema is superior to its parents and siblings in color (brighter red tuber skin), tuber uniformity, tuber appearance, and yield (higher marketable yield).

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**Exhibit A: Origin and Breeding History of the Variety** (continued)

**Variety Name:**

As a permanent potato variety name, Winema is unique to this variety as shown in The Potato Association of America "North American Potato Variety Inventory"  
(<http://www.umaine.edu/PAA/PVI.htm>).



**Exhibit B – Statement of Distinctiveness**

Winema is most similar to the potato varieties Red LaSoda and Dark Red Norland.

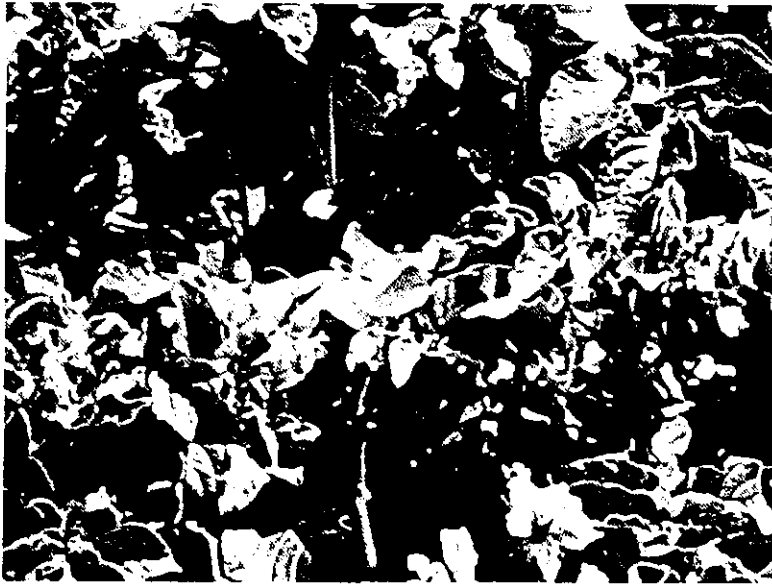
Red LaSoda and Dark Red Norland are commonly used as reference varieties in northwest potato variety development programs, against which potential new red-skinned varieties are compared. While Winema has characters in common with both, it has a number of distinctive characters which are stated below.

- 1) Winema stems have medium anthocyanin coloration, whereas both Red LaSoda and Dark Red Norland have absent to weak coloration.  
(See Document B-1.)
- 2) Winema leaves have weak to medium petiole anthocyanin coloration, whereas Red LaSoda has weak coloration and Dark Red Norland has absent to weak coloration.  
(See Document B-2.)
- 3) Winema has a closed foliage plant type, whereas both Red LaSoda and Dark Red Norland are intermediate between the open and closed types.  
(See Document B-3.)
- 4) Winema calyx anthocyanin coloration is strong to very strong, whereas calyx anthocyanin coloration of Red LaSoda and Dark Red Norland are medium and weak, respectively.  
(See Document B-4.)
- 5) Winema anther shape is a broad cone, similar to that of Dark Red Norland, whereas the anther shape of Red LaSoda is a pear-shaped cone.  
(See Document B-4.)
- 6) Winema corolla shape is pentagonal, similar to that of Red LaSoda, whereas Dark Red Norland has a semi-stellate corolla shape.  
(See Document B-4.)
- 7) Winema anther color is Yellow-Orange (14A RHS), similar to that of Red LaSoda (Yellow-Orange, 14A RHS), whereas Dark Red Norland anther color is more orange (Yellow-Orange, 17B RHS).  
(See Document B-4.)
- 8) Winema corolla inner surface color is Purple-Violet (82B RHS), whereas that of Red LaSoda is lighter (Purple Violet, 82D RHS), and Dark Red Norland has a Purple (76BRHS) corolla inner surface color.  
(See Document B-4.)
- 9) Winema tuber color is Red-Purple (58A RHS) and darker than either Red LaSoda (Red-Purple; 58D RHS) or Dark Red Norland (Red-Purple; 58B RHS).  
(See Document B-9.)

**Exhibit B – Statement of Distinctiveness** (continued)

- 10) Winema tuber eye depth is intermediate, whereas Red LaSoda eye depth is very deep, and Dark Red Norland eye depth is deep.  
(See Document B-9.)
- 11) Winema tubers have eyebrows that are not prominent, whereas Red LaSoda eyebrows have medium prominence and Dark Red Norland eyebrows are slightly prominent.  
(See Document B-9.)
- 12) Winema light sprouts have a conical general shape, where as both Red LaSoda and Dark Red Norland light sprouts are broad cylindrical shaped.  
(See Document B-12.)
- 13) Winema light sprout tips have a closed habit, whereas Red LaSoda has an intermediate habit and Dark Red Norland has an open habit.  
(See Document B-12.)
- 14) Winema has a higher yield of small tubers (< 4 ounces) than Red LaSoda.  
(See Document B-14.)
- 15) Winema has a greater percent marketable yield (< 4 to <= 10 ounces) than either Red LaSoda or Dark Red Norland.  
(See Document B-14.)
- 16) Winema has a lower yield of culls than either Red LaSoda or Dark Red Norland.  
(See Document B-14.)
- 17) Winema has a smaller average tuber size than either Red LaSoda or Dark Red Norland.  
(See Document B-14.)





**Winema Stems**

- Medium stem anthocyanin coloration.



**Red LaSoda Stems**

- Absent to weak stem anthocyanin coloration.



**Dark Red Norland Stems**

- Absent to weak stem anthocyanin coloration.



**Winema Leaves**

- Weak to medium petiole anthocyanin coloration.



**Red LaSoda Leaves**

- Weak petiole anthocyanin coloration.



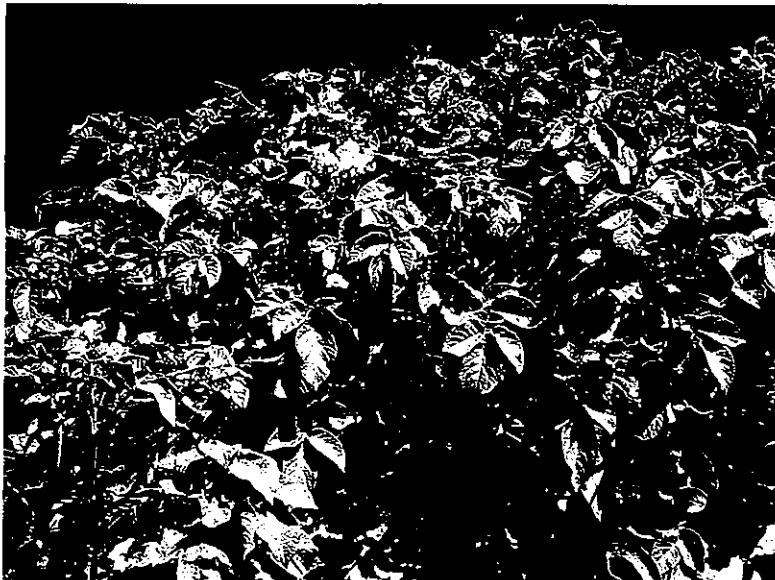
**Dark Red Norland Leaves**

- Absent to weak petiole anthocyanin coloration.



**Winema Plant**

- Closed type foliage.



**Red LaSoda Plant**

- Foliage is intermediate between the open and closed types.



**Dark Red Norland Plant**

- Foliage is intermediate between the open and closed types.



**Winema Flower**

- Calyx anthocyanin coloration is strong to very strong.
- Anther shape is a broad cone.
- Corolla shape is pentagonal.
- Anther color is Yellow-Orange (14A RHS).
- Corolla inner surface color is Purple-Violet (82B RHS).



**Red LaSoda Flower**

- Calyx anthocyanin coloration is medium.
- Anther shape is a pear-shaped cone.
- Corolla shape is pentagonal.
- Anther color is Yellow-Orange (14A RHS).
- Corolla inner surface color is Purple-Violet (82D RHS).



**Dark Red Norland Flower**

- Calyx anthocyanin coloration is weak.
- Anther shape is a broad cone.
- Corolla shape is semi-stellate.
- Anther color is Yellow-Orange (17B RHS).
- Corolla inner surface color is Purple (76B RHS).

**Winema Tubers**

- Tuber eye depth is intermediate.
- Eyebrows which are not prominent.
- Tuber color is Red-Purple (58A RHS).



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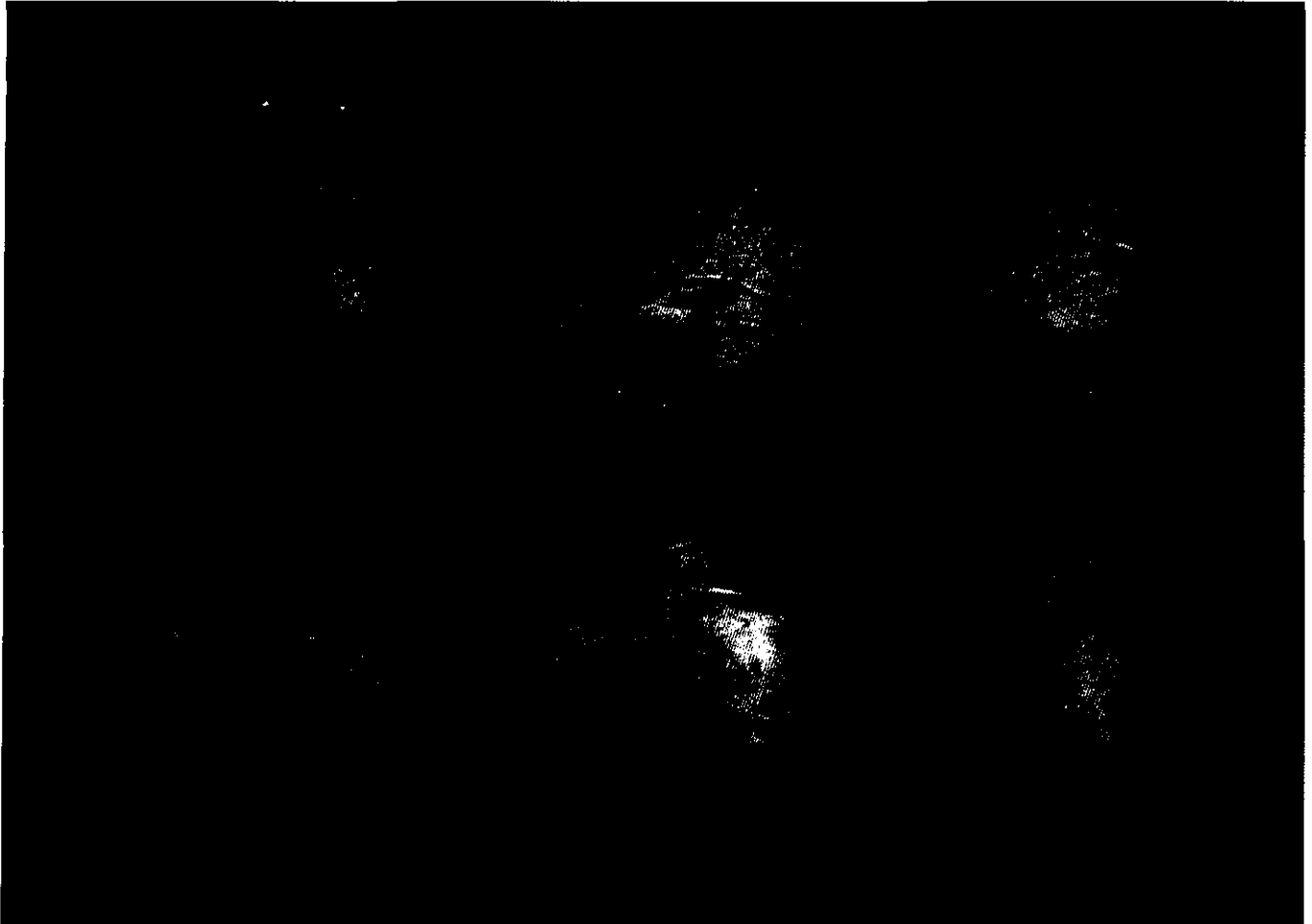
**Red LaSoda Tubers**

- Tuber eye depth is very deep.
- Eyebrows which have medium prominence.
- Tuber color is Red-Purple (58D RHS).



**Dark Red NorlandTubers**

- Tuber eye depth is deep.
- Eyebrows which are slightly prominent.
- Tuber color is Red-Purple (58B RHS).





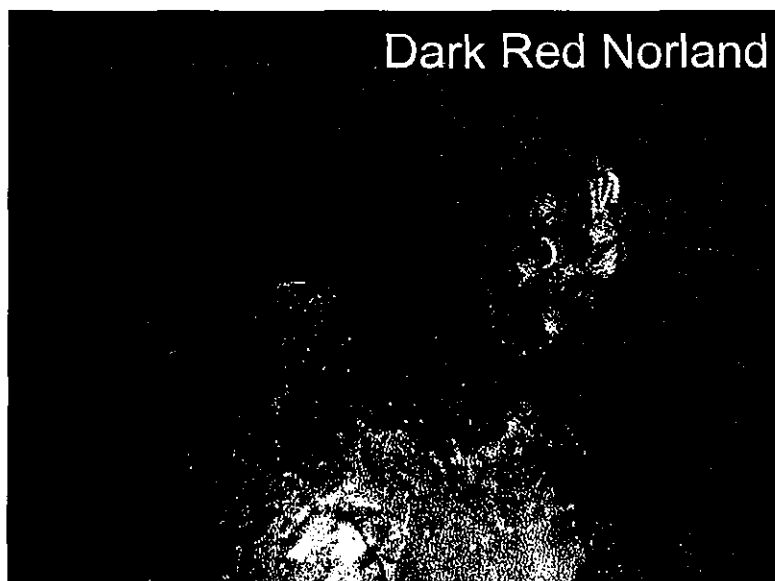
**Winema Light Sprout**

- Conical sprout shape.
- Sprout tip habit is closed.



**Red LaSoda Light Sprout**

- Broad cylindrical sprout shape.
- Sprout tip habit is intermediate.



**Dark Red Norland Light Sprout**

- Broad cylindrical sprout shape.
- Sprout tip habit is open.



**Distinctive Character:**

- Winema has a higher yield of small tubers (< 4 ounces) than Red LaSoda.
- Winema has a higher percent marketable yield (< 4 to ≤ 10 ounces) than either Red LaSoda or Dark Red Norland.
- Winema has a lower combined yield of No. 2's and culls than either Red LaSoda or Dark Red Norland.
- Winema has a smaller average tuber size than either Red LaSoda or Dark Red Norland.

Three years of data from Corvallis, OR, are presented.

Note: All yields are reported as Hundredweight (Cwt)/acre

**Trial 1**

Year: 2001

Location: OSU Experiment Station, Corvallis, OR

Plot Size: Four rows x 25'/row (approximately 132 plants total)

Planting Date: May 19

Harvest Date: September 21

Evaluation Date: September 22-30

Treatment	Rep	Marketable Yield (<4 to 10 oz.)				>10 oz	#2's+Culls	Total Yield	Percent <4 to 10 oz.	Ave. Tuber Size, oz.
		<4 oz	4-6 oz	6-10 oz	Total					
Winema	1	57.8	40.6	172.8	271.22	129.8	51.7	452.6	59.9%	6.19
Winema	2	44.3	57.2	110.7	212.18	115.6	42.4	370.2	57.3%	6.00
Winema	3	31.4	21.5	103.3	156.21	113.8	53.5	323.5	48.3%	5.57
Winema	4	46.7	57.2	111.9	215.87	113.2	78.1	407.1	53.0%	6.79
Mean		45.0	44.1	124.7	213.9	118.1	56.5a	388.4	54.5%a	6.14a
Red LaSoda	1	24.0	31.4	101.5	156.83	125.5	121.2	403.4	38.9%	8.75
Red LaSoda	2	22.1	40.0	109.5	171.59	146.4	94.1	412.1	41.6%	9.02
Red LaSoda	3	34.4	28.3	112.5	175.28	139.0	128.5	442.8	39.6%	8.95
Red LaSoda	4	27.7	35.7	87.9	151.29	74.4	130.4	356.1	42.5%	8.38
Mean		27.1	33.8	102.9	163.7	121.3	118.5c	403.6	40.8%b	8.78b
Dk. R. Norland	1	27.1	50.4	198.0	275.52	139.0	113.2	527.7	52.2%	9.31
Dk. R. Norland	2	40.6	70.7	185.7	297.05	123.6	75.6	496.3	59.9%	8.27
Dk. R. Norland	3	52.3	27.7	142.7	222.63	127.9	78.1	428.7	51.9%	6.66
Dk. R. Norland	4	33.2	32.6	135.9	201.72	159.3	99.6	460.6	43.8%	7.88
Mean		38.3	45.4	165.6	249.2	137.5	91.8b	478.3	52.0%a	8.03b
LSD (0.05)		NS	NS	39.8	60.9	NS	23.6	72.7	10.9	1.82

Exhibit B Document B-14 (continued)

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Trial 2

Year: 2002

Location: OSU Experiment Station, Corvallis, OR

Plot Size: Four rows x 25'/row (approximately 132 plants total)

Planting Date: May 23

Harvest Date: September 24

Evaluation Date: September 25-30

<u>Treatment</u>	<u>Rep</u>	<u>Marketable Yield (&lt;4 to 10 oz.)</u>				<u>&gt;10 oz</u>	<u>#2's+Culls</u>	<u>Total Yield</u>	<u>Percent &lt;4 to 10 oz.</u>	<u>Ave. Tuber Size, oz.</u>
		<u>&lt;4 oz</u>	<u>4-6 oz</u>	<u>6-10 oz</u>	<u>Total</u>					
Winema	1	89.8	76.3	242.9	408.98	300.7	80.6	790.3	51.8%	7.04
Winema	2	56.0	41.2	326.0	423.12	277.4	25.2	725.7	58.3%	8.00
Winema	3	76.9	99.0	325.3	501.23	139.0	59.0	699.3	71.7%	6.21
Winema	4	102.7	67.0	332.7	502.46	282.9	85.5	870.8	57.7%	6.80
Mean		81.5a	70.9	306.7	458.9	250.0	62.5a	771.5	60.0%a	7.01a
Red LaSoda	1	52.3	34.4	142.7	229.4	198.6	167.9	595.9	38.5%	7.83
Red LaSoda	2	46.7	36.3	354.9	437.88	190.0	108.9	736.8	59.4%	7.15
Red LaSoda	3	44.9	19.7	186.3	250.92	207.3	65.8	524.0	47.9%	7.53
Red LaSoda	4	53.5	21.5	89.2	164.21	188.2	142.1	494.5	33.2%	7.66
Mean		49.5b	28.0	193.3	270.6	196.0	121.3b	587.8	44.5%b	7.54b
Dk. R. Norland	1	64.0	32.6	217.7	314.27	174.0	158.7	647.0	48.6%	6.50
Dk. R. Norland	2	57.2	59.7	298.9	415.74	91.6	86.1	593.5	70.1%	5.89
Dk. R. Norland	3	70.7	43.1	267.5	381.3	91.0	169.1	641.4	59.4%	6.98
Dk. R. Norland	4	101.5	30.8	169.1	301.35	78.7	159.3	539.4	55.9%	5.20
Mean		73.3a	41.5	238.3	353.2	108.9	143.3b	605.3	58.5%a	6.14a
LSD (0.05)		26.8	24.3	76.6	93.9	62.6	40.8	105.4	10.1	1.07

## Exhibit B Document B-14 (continued)

#200100093

## Trial 3

Year: 2003

Location: OSU Experiment Station, Corvallis, OR

Plot Size: Four rows x 25'/row (approximately 132 plants total)

Planting Date: May 20

Harvest Date: September 20

Evaluation Date: September 21-30

Treatment	Rep	Marketable Yield (<4 to 10 oz.)				>10 oz	#2's+Culls	Total Yield	Percent <4 to 10 oz.	Ave. Tuber Size, oz.
		<4 oz	4-6 oz	6-10 oz	Total					
Winema	1	30.1	82.4	58.4	170.97	27.7	85.5	284.1	60.2%	4.18
Winema	2	24.6	82.4	119.3	226.32	65.2	60.3	351.8	64.3%	5.90
Winema	3	24.6	121.8	203.0	349.32	69.5	91.0	509.8	68.5%	5.82
Winema	4	35.7	49.2	80.0	164.82	22.1	76.3	263.2	62.6%	4.10
Mean		29.0a	83.9	115.2	227.9	46.1	78.3	352.2	64.0%a	5.00a
Red LaSoda	1	6.2	21.5	129.2	156.83	143.3	97.8	397.9	39.4%	7.78
Red LaSoda	2	22.8	32.6	100.2	155.6	205.4	95.3	456.3	34.1%	7.51
Red LaSoda	3	20.9	44.9	165.4	231.24	281.7	74.4	587.3	39.4%	9.04
Red LaSoda	4	19.1	52.3	110.1	181.43	187.6	57.2	426.2	42.6%	7.98
Mean		17.3b	37.8	126.2	181.3	204.5	81.2	466.9	38.8%c	8.08b
Dk. R. Norland	1	23.4	56.6	98.4	178.35	82.4	125.5	386.2	46.2%	6.20
Dk. R. Norland	2	19.7	48.6	180.8	249.08	187.6	95.9	532.6	46.8%	8.10
Dk. R. Norland	3	22.1	51.0	105.8	178.97	142.7	116.9	438.5	40.8%	8.33
Dk. R. Norland	4	11.1	89.8	137.1	238.01	103.3	32.6	373.9	63.7%	10.81
Mean		19.0b	61.5	130.5	211.1	129.0	92.7	432.8	49.5%b	8.36b
LSD (0.05)		9.1	32.4	NS	NS	92.2	NS	NS	10.6	1.48

Statistical Analyses (by Year and Overall)

Year	Clone	Marketable Yield (<4 to 10 oz.)					Total Yield	Percent <4 to 10 oz.	Ave. Tuber Size, oz	
		<4 oz.	4-6 oz.	6-10 oz.	Total	> 10 oz.				#2s+Culls
2001	Dk R. Norland	38.3	45.5	165.8	249.5	137.5	91.8	478.5	52.0	8.03
2001	Red LaSoda	27.0	33.8	102.8	163.8	121.0	118.5	403.5	40.8	8.78
2001	Winema	45.0	44.3	124.8	213.8	118.3	56.5	388.3	54.5	6.14
	Mean	36.8	41.2	131.1	209.0	125.6	88.9	423.4	49.1	7.65
	LSD (0.05)	NS	NS	39.8	60.9	NS	23.6	72.7	10.9	1.82
	Probability > F			<0.001	<0.001		<0.001	0.003	<0.001	<0.001
2002	Dk R. Norland	73.3	41.8	238.5	353.0	109.0	143.3	605.0	58.5	6.14
2002	Red LaSoda	49.5	28.0	193.3	270.5	196.0	121.3	587.8	44.5	7.54
2002	Winema	81.5	70.8	306.8	458.8	250.0	62.5	771.5	60.0	7.01
	Mean	68.1	46.8	246.2	360.8	185.0	109.0	654.8	54.3	6.90
	LSD (0.05)	26.8	24.3	76.6	93.9	62.6	40.8	105.4	10.1	1.07
	Probability > F	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
2003	Dk R. Norland	19.0	61.8	130.5	211.0	129.0	92.8	432.8	49.5	8.36
2003	Red LaSoda	17.3	38.0	126.0	181.3	204.5	81.0	466.8	38.8	8.08
2003	Winema	29.0	83.8	115.0	227.8	46.0	78.0	352.3	64.0	5.00
	Mean	21.8	61.2	123.8	206.7	126.5	83.9	417.3	50.8	7.15
	LSD (0.05)	9.1	32.4	NS	NS	92.2	NS	NS	10.6	1.48
	Probability > F	0.006	<0.001			<0.001			<0.001	<0.001
Overall	Dk R. Norland	43.5a	49.7	178.3	271.2	125.2	109.3b	505.4	53.3b	7.51b
Overall	Red LaSoda	31.3b	33.3	140.7	205.2	173.8	106.9b	486.0	41.3c	8.13b
Overall	Winema	51.8a	66.3	182.2	300.1	138.1	65.7a	504.0	59.5a	6.05a
Overall	Mean	42.2	49.7	167.0	258.8	145.7	93.9	498.5	51.4	7.23
Overall	LSD (0.05)									
Overall	Clone	11.2	16.4	36.1	45.5	NS	19.8	NS	6.0	0.84
Overall	Probability > F	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001	<0.001
Overall	LSD (0.05)									
Overall	Year	13.3	13.7	35.8	30.8	23.6	18.6	39.3	3.1	0.5
Overall	LSD (0.05) Yr									
Overall	x C	19.4	28.4	62.5	78.9	69.4	34.2	107.7	10.3	1.5
Overall	Dark R. Norland	43.9b	60.8	164.1	268.7	152.5	81.7b	502.8		54.9b
Overall	Mazama	78.4a	101.6	190.0	369.9	120.0	36.0a	526.0		73.3a
Overall	Red LaSoda	30.9c	40.8	137.0	208.7	217.3	112.4c	538.5		38.8c
Overall	Mean	51.1	67.7	163.7	282.4	163.3	76.7	522.4		55.7
Overall	LSD									
Overall	(0.05)Cultivar	6.97	9.91	NS	26.89	28.87	12.92	NS		4.01
Overall	Probability of F	0.005	<0.001	0.034	<0.001	0.003	<0.001	0.466		<0.001
Overall	LSD (0.05) Site-									
Overall	Year	6.9	11.14	29.66	33.52	23.11	19.44	42.33		4.13
Overall	LSD (0.05) S-Y x									
Overall	Cv.	18.44	26.21	57.62	NS	76.37	34.18	109.62		10.61

NAME OF APPLICANT (S) State of Oregon by/through STBHE acting on behalf of Oregon State University Item 11. LMC 7-16-07 per correspondence May 24, 2007 ADDRESS (Street and No., or RD No., City, State, Zip Code, and Country) Office of Technology Transfer Oregon State University 312 Kerr Administration Building Corvallis, OR 97331 LMC 7-2-2007	TEMPORARY OR EXPERIMENTAL DESIGNATION NDO2438-6R	VARIETY NAME Winema
		FOR OFFICIAL USE ONLY PVPO NUMBER #200100093

REFERENCE VARIETIES: Enter the reference variety name in the appropriate box.

Application Variety (V)	Reference Variety 1 (R1)	Reference Variety 2 (R2)	Reference Variety 3 (R3)	Reference Variety 4 (R4)
Winema	Red LaSoda	Dark Red Norland		

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

## 1. MARKET CHARACTERISTICS:

## \*MARKET CLASS:

1 = Yellow-flesh Tablestock 2 = Round-white Tablestock 3 = Chip-processing 4 = Frozen-processing  
5 = Russet Tablestock 6 = Other RED TABLE-STOCK

V	6	R1	6	R2	6	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 2. LIGHT SPROUT CHARACTERISTICS: (See Figure 1)

## \*LIGHT SPROUT: GENERAL SHAPE

1 = Spherical 2 = Ovoid 3 = Conica 4 = Broad cylindrica 5 = Narrow cylindrical 6 = Other \_\_\_\_\_

V	3	R1	4	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

## \*LIGHT SPROUT BASE: PUBESCENCE OF TIP

1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	4	R1	4	R2	2	R3		R4	
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## \*LIGHT SPROUT BASE: ANTHOCYANIN COLORATION

1 = Green 2 = Red-violet 3 = Blue-violet 4 = Other(describe) \_\_\_\_\_

V	2	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## \*LIGHT SPROUT BASE: INTENSITY OF ANTHOCYANIN COLORATION (IF PRESENT)

1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	5	R1	4	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

## \* LIGHT SPROUT TIP: HABIT

1 = Closed 2 = Intermediate 3 = Open

V	1	R1	2	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 2. LIGHT SPROUT CHARACTERISTICS: (continued)

## LIGHT SPROUT TIP: PUBESCENCE

1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	4	R1	4	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## LIGHT SPROUT TIP ANTHOCYANIN COLORATION

1 = Green 2 = Red-violet 3 = Blue-violet 4 = Other(describe) \_\_\_\_\_

V	2	R1	3	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## LIGHT SPROUT TIP: INTENSITY OF ANTHOCANIN COLORATION (IF PRESENT)

1 = Absent 2 = Weak 3 = Medium 4 = Strong 5 = Very Strong

V	4	R1	4	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## LIGHT SPROUT ROOT INITIALS: FREQUENCY

1 = Short 2 = Medium 3 = Long  
ABSENT SOME ABUNDANT

V	2	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 3. PLANT CHARACTERISTICS:

## GROWTH HABIT: (See Figure 2)

3 = Erect (&gt;45° with ground) 5 = Semi-erect (30-45° with ground) 7 = Spreading

V	3	R1	3	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

## TYPE:

1 = Stem (foliage open, stems clearly visible) 2 = Intermediate 3 = Leaf (Foliage closed, stems hardly visible)

V	3	R1	2	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## MATURITY: Days after planting (DAP) at vine senescence

V	100	R1	110	R2	115	R3		R4	
---	-----	----	-----	----	-----	----	--	----	--

## PLANTING DATE:

V	MAY 20 1997	R1	MAY 20 1997	R2	MAY 20 1997	R3		R4	
---	-------------	----	-------------	----	-------------	----	--	----	--

## \*REGIONAL AREA:

1 = Pacific North West (WA, OR, ID, CO, CA) 2 = North Central (ND, WI, MI, MN, OH) 3 = North East (ME, NY, PA, NJ, MD, MA, RI,)  
 4 = Mid-Atlantic Erect (VI, NC, SC, South NJ, FL) 5 = South (LA, TX, AZ, NE) 6 = Canada  
 7 = Europe 8 = England 9 = Latin America 10 = Brazil 11 = Other \_\_\_\_\_

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## MATURITY CLASS:

1 = Very Early (&lt;100 DAP) 2 = Early (100-110 DAP) 3 = Mid-season (111-120 DAP) 4 = Late (121-130 DAP) 5 = Very Late (&gt;130 DAP).

V	2	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

06/6/2006 Per Exhibit A description

LMC 7-2-07

**4. STEM CHARACTERISTICS:** Measure at early first bloom**\* STEM ANTHOCYANIN COLORATION:**

1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very Strong

V	5	R1	2	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

**STEM WINGS:** (See Figure 3)

1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very Strong

V	2	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

**5. LEAF CHARACTERISTICS:****LEAF COLOR:** (Observe fully developed leaves located on middle 1/3 of plant)

1 = Yellowing-green 2 = Olive-green 3 = Medium Green 4 = Dark Green 5 = Grey-green 6 = Other \_\_\_\_\_

V	3	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

**LEAF COLOR CHART VALUE:** (Royal Horticulture Society Color Chart or Munsell Color Chart)

(Observe fully developed leaves located on middle 1/3 of plant and circle the appropriate color chart)

V	139A	R1	137B	R2	139A	R3		R4	
---	------	----	------	----	------	----	--	----	--

**LEAF PUBESCENCE DENSITY:**

1 = Absent 2 = Sparse 3 = Medium 4 = Thick 5 = Heavy

V	3	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

**LEAF PUBESCENCE LENGTH:**

1 = None 2 = Short 3 = Medium 4 = Long 5 = Very Long

V	2	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

(Note Descriptor #15 can be used to describe the type and length of the glandular trichomes observed.)

**\* LEAF SILHOUETTE:** (See Figure 4)

1 = Closed 3 = Medium 5 = Open

V	5	R1	5	R2	5	R3		R4	
---	---	----	---	----	---	----	--	----	--

**PETIOLES ANTHOCYANIN COLORATION:**

1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very Strong

V	4	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

**LEAF STIPULES SIZE:** (See Figure 5)

1 = Absent 3 = Small 5 = Medium 7 = Large

V	4	R1	4	R2	5	R3		R4	
---	---	----	---	----	---	----	--	----	--

**TERMINAL LEAFLET SHAPE** (See Figures 6 and 7)

1 = Narrowly ovate 2 = Medium Ovate 3 = Broadly Ovate 4 = Lanceolate 5 = Elliptical 6 = Obovate 7 = Oblong 8 = Other \_\_\_\_\_

V	2	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 5. LEAF CHARACTERISTICS: (continued)

**TERMINAL LEAFLET TIP SHAPE:** (See Figures 6 and 8)

1 = Acute 2 = Cuspidate 3 = Acuminate 4 = Obtuse 5 = Other \_\_\_\_\_

V	3	R1	2	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

**\* TERMINAL LEAFLET BASE SHAPE:** (See Figure 9)

1 = Cuneate 2 = Acute 3 = Obtuse 4 = Cordate 5 = Truncate 6 = Lobed 7 = Other \_\_\_\_\_

V	4	R1	4	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

**TERMINAL LEAFLET MARGIN WAVINESS:**

1 = Absent 2 = Slight 3 = Weak 4 = Medium 5 = Strong

V	3	R1	1	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

**NUMBER OF PRIMARY LEAFLET PAIRS:** (See Figure 6)**AVERAGE:**

V	5.0	R1	5.8	R2	6.0	R3		R4	
---	-----	----	-----	----	-----	----	--	----	--

**RANGE:**

V	5 to 5	R1	5 to 6	R2	6 to 6	R3	to	R4	to
---	--------	----	--------	----	--------	----	----	----	----

**PRIMARY LEAFLET TIP SHAPE:** (See Figures 6 and 8)

1 = Acute 2 = Cuspidate 3 = Acuminate 4 = Obtuse 5 = Other \_\_\_\_\_

V	3	R1	2	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

**PRIMARY LEAFLET SIZE:**

1 = Very Small 2 = Small 3 = Medium 4 = Large 5 = Very Large

V	3	R1	4	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

**PRIMARY LEAFLET SHAPE:** (See Figures 6 and 7)

1 = Narrowly ovate 2 = Medium ovate 3 = Broadly ovate 4 = Lanceolate 5 = Elliptical 6 = Ovate 7 = Oblong 8 = Other \_\_\_\_\_

V	2	R1	2	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

**PRIMARY LEAFLET BASE SHAPE:** (See Figures 6 and 9)

1 = Cuneate 2 = Acute 3 = Obtuse 4 = Cordate 5 = Truncate 6 = Lobed 7 = Other \_\_\_\_\_

V	4	R1	4	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

**NUMBER OF SECONDARY AND TERTIARY LEAFLET PAIRS:** (See Figure 6)**AVERAGE:**

V	6	R1	8	R2	10	R3		R4	
---	---	----	---	----	----	----	--	----	--

**RANGE:**

V	4 to 8	R1	7 to 13	R2	8 to 13	R3	to	R4	to
---	--------	----	---------	----	---------	----	----	----	----



## 5. LEAF CHARACTERISTICS: (continued)

## NUMBER OF INFLORESCENCE/PLANT:

## AVERAGE:

V	5,4	R1	3,3	R2	3,6	R3		R4	
---	-----	----	-----	----	-----	----	--	----	--

## RANGE:

V	3 to 9	R1	3 to 4	R2	3 to 5	R3	to	R4	to
---	--------	----	--------	----	--------	----	----	----	----

## NUMBER OF FLORETS/INFLORESCENCE:

## AVERAGE:

V	17,0	R1	17,7	R2	20,5	R3		R4	
---	------	----	------	----	------	----	--	----	--

## RANGE:

V	12 to 24	R1	11 to 27	R2	14 to 29	R3	to	R4	to
---	----------	----	----------	----	----------	----	----	----	----

\* COROLLA INNER SURFACE COLOR CHART VALUE: (Royal Horticulture Society Color Chart or Munsell Color Chart (Measure predominant color of newly open flower and circle the appropriate color chart))

V	82 B	R1	82 D	R2	76 B	R3		R4	
---	------	----	------	----	------	----	--	----	--

\* COROLLA OUTER SURFACE COLOR CHART VALUE: (Royal Horticulture Society Color Chart or Munsell Color Chart (Measure predominant color of newly open flower and circle the appropriate color chart))

V	82 B	R1	82 D	R2	76 B	R3		R4	
---	------	----	------	----	------	----	--	----	--

\* COROLLA INNER SURFACE COLOR: (Measure predominant color of newly open flower, if flowers are bi-color please use the ratio codes)

1 = White 2 = Red-violet 3 = Blue-violet 4 = Cream 5 = Red-purple 6 = Blue 7 = Pink 8 = Pink-white 9 = Purple 10 = Violet  
 11 = Purple-violet 13 = Violet-White 1:1 14 = Violet-White 1:3 15 = Violet-White 3:1 16 = Violet-White Halo 17 = Pink-White 1:1 18 =  
 Pink-White 1:3 19 = Pink-White 3:1 20 = Pink-White Halo 21 = RedViolet-White 1:1 22 = RedViolet-White 1:3 23 = RedViolet-White 3:1  
 24 = RedViolet-White Halo 25 = BlueViolet-White 1:1 26 = BlueViolet-White 1:3 27 = BlueViolet-White 3:1 28 = BlueViolet-White Halo  
 12 = Other

V	11	R1	11	R2	9	R3		R4	
---	----	----	----	----	---	----	--	----	--

## COROLLA SHAPE: (See Figure 10)

1 = Very rotate 2 = Rotate 3 = Pentagonal 4 = Semi-stellate 5 = Stellate

V	3	R1	3	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 6. INFLORESCENCE CHARACTERISTICS:

## CALYX ANTHOCYANIN COLORATION:

1 = Absent 3 = Weak 5 = Medium 7 = Strong 9 = Very strong

V	8	R1	5	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

ANTHER COLOR CHART VALUE: (Royal Horticulture Society Color Chart or Munsell Color Chart (Measure when newly opened flower is fully expanded and circle the appropriate color chart))

V	14A	R1	14A	R2	17B	R3		R4	
---	-----	----	-----	----	-----	----	--	----	--

## ANTHER SHAPE: (See Figure 11)

1 = Broad cone 2 = Narrow cone 3 = Pear-shaped cone 4 = Loose 5 = Other

V	1	R1	3	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 6. INFLORESCENCE CHARACTERISTICS: (continued)

## POLLEN PRODUCTION:

1 = None 3 = Some 5 = Abundant

V	4	R1	2	R2	4	R3		R4	
---	---	----	---	----	---	----	--	----	--

## STIGMA SHAPE: (See Figure 12)

1 = Capitate 2 = Clavate 3 = Bi-lobed

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

STIGMA COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V	137 C	R1	137 C	R2	138 A	R3		R4	
---	-------	----	-------	----	-------	----	--	----	--

## BERRY PRODUCTION: (Under field conditions)

1 = Absent 3 = Low 5 = Moderate 7 = Heavy 9 = Very Heavy

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 7. TUBER CHARACTERISTICS:

## \* PREDOMINANT SKIN COLOR:

1 = White 2 = Light Yellow 3 = Yellow 4 = Buff 5 = Tan 6 = Brown 7 = Pink 8 = Red 9 = Purplish-red  
10 = Purple 11 = Dark purple-black 12 = Other \_\_\_\_\_

V	9	R1	9	R2	9	R3		R4	
---	---	----	---	----	---	----	--	----	--

PREDOMINANT SKIN COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V	58 A	R1	58 D	R2	58 B	R3		R4	
---	------	----	------	----	------	----	--	----	--

## SECONDARY SKIN COLOR:

1 = Absent 2 = Present (please describe)

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

SECONDARY SKIN COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color)

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

## SECONDARY SKIN COLOR DISTRIBUTION: (See Figure 13)

1 = Eyes 2 = Eyebrows 3 = Splashed 4 = Scattered 5 = Spectacled 6 = Stippled 7 = Other \_\_\_\_\_

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

## SKIN TEXTURE:

1 = Smooth 2 = Rough (flaky) 3 = Netled 4 = Russetted 5 = Heavily russetted 6 = Other \_\_\_\_\_

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 7. TUBER CHARACTERISTICS: (continued)

## \* TUBER SHAPE: (See Figure 14)

1 = Compressed 2 = Round 3 = Oval 4 = Oblong 5 = Long 6 = Other \_\_\_\_\_

V	3	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

## TUBER THICKNESS:

1 = Round 2 = Medium thick 3 = Slightly flattened 4 = Flattened 5 = Other \_\_\_\_\_

V	2	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

## TUBER LENGTH (mm):

## AVERAGE:

V	84	R1	85	R2	84	R3		R4	
---	----	----	----	----	----	----	--	----	--

## RANGE:

V	64 to 117	R1	57 to 108	R2	64 to 108	R3	to	R4	to
---	-----------	----	-----------	----	-----------	----	----	----	----

## STANDARD DEVIATION:

V	11.2	R1	15.5	R2	12.4	R3		R4	
---	------	----	------	----	------	----	--	----	--

## AVERAGE WEIGHT OF SAMPLE TAKEN:

V	5 Kg.	R1	5 Kg.	R2	5 Kg.	R3		R4	
---	-------	----	-------	----	-------	----	--	----	--

## TUBER WIDTH (mm)

## AVERAGE:

V	74	R1	72	R2	71	R3		R4	
---	----	----	----	----	----	----	--	----	--

## RANGE:

V	60 to 89	R1	51 to 92	R2	54 to 89	R3	to	R4	to
---	----------	----	----------	----	----------	----	----	----	----

## STANDARD DEVIATION:

V	8.3	R1	10.8	R2	9.0	R3		R4	
---	-----	----	------	----	-----	----	--	----	--

## AVERAGE WEIGHT OF SAMPLE TAKEN (g):

V	5000	R1	5000	R2	5000	R3		R4	
---	------	----	------	----	------	----	--	----	--

## 7. TUBER CHARACTERISTICS: (continued)

## TUBER THICKNESS (mm):

## AVERAGE:

V	63	R1	58	R2	56	R3		R4	
---	----	----	----	----	----	----	--	----	--

## RANGE:

V	51 to 73	R1	41 to 70	R2	41 to 64	R3	to	R4	to
---	----------	----	----------	----	----------	----	----	----	----

## STANDARD DEVIATION:

V	5.6	R1	7.6	R2	4.9	R3		R4	
---	-----	----	-----	----	-----	----	--	----	--

## AVERAGE WEIGHT OF SAMPLE TAKEN (g):

V	5000	R1	5000	R2	5000	R3		R4	
---	------	----	------	----	------	----	--	----	--

## TUBER EYE DEPTH:

1 = Protruding    3 = Shallow    5 = Intermediate    7 = Deep    9 = Very deep

V	5	R1	9	R2	7	R3		R4	
---	---	----	---	----	---	----	--	----	--

## TUBER LATERAL EYES:

1 = Protruding    3 = Shallow    5 = Intermediate    7 = Deep    9 = Very deep

V	5	R1	7	R2	5	R3		R4	
---	---	----	---	----	---	----	--	----	--

## NUMBER EYE/TUBER:

## AVERAGE:

V	15.0	R1	13.4	R2	14.2	R3		R4	
---	------	----	------	----	------	----	--	----	--

## RANGE:

V	9 to 21	R1	8 to 19	R2	10 to 18	R3	to	R4	to
---	---------	----	---------	----	----------	----	----	----	----

## DISTRIBUTION OF TUBER EYES:

1 = Predominantly apical    2 = Evenly distributed

V	2	R1	2	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## PROMINENCE OF TUBER EYEBROWS:

1 = Absent    2 = Slight prominence    3 = Medium prominence    4 = Very prominent    5 = Other \_\_\_\_\_

V	1	R1	3	R2	2	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 7. TUBER CHARACTERISTICS: (continued)

## PREDOMINANT TUBER FLESH COLOR

1 = White    2 = Light Yellow    3 = Yellow    4 = Buff    5 = Tan    6 = Brown    7 = Pink    8 = Red    9 = Purplish-red  
 10 = Purple    11 = Dark purple-black    12 = Other \_\_\_\_\_

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

PRIMARY TUBER FLESH COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V	155 B	R1	155 B	R2	155 C	R3		R4	
---	-------	----	-------	----	-------	----	--	----	--

## SECONDARY TUBER FLESH COLOR:

1 = Absent    2 = Present, please describe: \_\_\_\_\_

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

SECONDARY TUBER FLESH COLOR CHART VALUE: Royal Horticulture Society Color Chart or Munsell Color Chart (Circle the appropriate color chart)

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

## NUMBER OF TUBERS/PLANT:

1 = Low (<8)    2 = Medium (8-15)    3 = High (>15)

V	1	R1	1	R2	1	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 8. DISEASES CHARACTERISTICS:

DISEASES REACTION: 0 = Not Tested 1 = Highly Resistant 2 = Resistant Few Symptoms 3 = Resistance Few Lesions in Number and Size  
 4 = Moderately Resistance 5 = Intermedia Susceptible 6 = Moderate Susceptible  
 7 = Susceptible 9 = Highly Susceptible

## LATE BLIGHT: (Phytophthora)

V	6	R1	7	R2	7	R3		R4	
---	---	----	---	----	---	----	--	----	--

## EARLY BLIGHT: (Alternaria)

V	0	R1	0	R2	0	R3		R4	
---	---	----	---	----	---	----	--	----	--

## SOFT ROT (Erwinia)

V	0	R1	0	R2	0	R3		R4	
---	---	----	---	----	---	----	--	----	--

## COMMON SCAB (Streptomyces)

V	0	R1	0	R2	0	R3		R4	
---	---	----	---	----	---	----	--	----	--

## POWDERY SCAB (Spongospora)

V	0	R1	0	R2	0	R3		R4	
---	---	----	---	----	---	----	--	----	--

## DRY ROT (Fusarium)

V	6	R1	0	R2	0	R3		R4	
---	---	----	---	----	---	----	--	----	--

## POTATO LEAF ROLL VIRUS (PLRV)

V	7	R1	7	R2	7	R3		R4	
---	---	----	---	----	---	----	--	----	--

## 8. DISEASES CHARACTERISTICS: (continued)

## POTATO VIRUS X (PVX)

V	7	R1	7	R2	7	R3		R4	
---	---	----	---	----	---	----	--	----	--

## POTATO VIRUS Y (PVY)

V	8	R1	7	R2	7	R3		R4	
---	---	----	---	----	---	----	--	----	--

## POTATO VIRUS M (PVM)

V	○	R1	○	R2	○	R3		R4	
---	---	----	---	----	---	----	--	----	--

## POTATO VIRUS A (PVA)

V	○	R1	○	R2	○	R3		R4	
---	---	----	---	----	---	----	--	----	--

## GOLDEN NEMATODE (Globodera)

V	○	R1	○	R2	○	R3		R4	
---	---	----	---	----	---	----	--	----	--

## ROOT - KNOT NEMATODE (Meloidogyne)

V	○	R1	○	R2	○	R3		R4	
---	---	----	---	----	---	----	--	----	--

## OTHER DISEASE

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

## PHYSIOLOGICAL DISORDER

1 = Malformed shape  
6 = Blackheart2 = Tuber cracking  
7 = Internal sprouting3 = Feathering  
8 = Other

4 = Hollow heart

5 = Internal necrosis

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

## 9. PESTS CHARACTERISTICS:

PEST REACTION: 0 = Not Tested 1 = Highly Resistant 2 = Resistant Few Symptoms 3 = Resistance Few Lesions in Number and Size  
4 = Moderately Resistance 5 = Intermediate Susceptible 6 = Moderate Susceptible  
7 = Susceptible 9 = Highly Susceptible

COLORADO POTATO BEETLE (CPB) (*Leptinotarsa*)

V	○	R1	○	R2	○	R3		R4	
---	---	----	---	----	---	----	--	----	--

GREEN PEACH APHID (*Myzus*)

V	○	R1	○	R2	○	R3		R4	
---	---	----	---	----	---	----	--	----	--

## OTHER:

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

## OTHER:

V		R1		R2		R3		R4	
---	--	----	--	----	--	----	--	----	--

**10. GENE TRAITS:**INSERTION OF GENES: 1 = YES 2 = NO ☒

IF YES, describe the gene(s) introduced or attach information:

**11. QUALITY CHARACTERISTICS:****CHIEF MARKET:**

SPECIFIC GRAVITY (wt. air/wt. air - wt. water)

1 = &lt;1.060 2 = 1.060-1.069 3 = 1.070-1.079 4 = 1.080-1.089 5 = &gt;1.090

V	2	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

**TOTAL GLYCOALKALOID CONTENT** (mg./100 g. fresh tuber)

V	3	R1	3	R2	3	R3		R4	
---	---	----	---	----	---	----	--	----	--

**OTHER QUALITY CHARACTERISTICS:** Describe any other quality characteristics that may aid in identification, (e.g., chip-processing, french fry processing, baking, boiling, after-cooking darkening). Please attach data and corresponding protocol.**12. CHEMICAL IDENTIFICATION:**

Describe chemical traits of the candidate variety that aid in its identification (e.g., protein or DSN electrophoresis). Please attach data and the corresponding protocol.

**13. FINGER PRINTING MARKERS:**ISOZYMES 1 = YES 2 = NO ☒

IF YES, attach information

**14. DNA PROFILE:** 1 = YES 2 = NO ☒

IF YES, attach information

**15. ADDITIONAL COMMENTS AND CHARACTERISTICS:**

Include any additional descriptors that would be useful in distinguishing the candidate variety.



**Exhibit D: Additional Description of the Variety (optional)**

1. "Winema: An Early Maturing, Red-Skinned Cultivar for Fresh Market"  
Rykbost, K.A., et al. 2001.  
American Journal of Potato Research (2001) 78:371-375.
2. Variety Description: "WINEMA (NDO2438-6R)"  
Mosley, A.R., et al. 2001.  
<http://oregonstate.edu/potatoes/Winema.PDF>
3. One-page Variety Profile: "Winema"  
Adapted from the Variety Description  
<http://oregonstate.edu/potatoes/WINEMAProfile.pdf>

## Winema: An Early Maturing, Red-Skinned Cultivar for Fresh Market<sup>1</sup>

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### ABSTRACT

Winema, an early maturing, red-skinned cultivar for fresh market use, was jointly released in 2000 by the Agricultural Experiment Stations of Oregon, North Dakota, California, Idaho, and Washington. Winema was evaluated in irrigated trials in Oregon and California from 1990 to 2000 and in the Western Regional Trial in 1995, 1997, and 1998. Winema has produced lower total yields than Dark Red Norland and Red LaSoda at most locations, but similar or higher marketable yields and significantly fewer culls. In 20 location-years of replicated Oregon and California trials, Winema produced 108% and 99% of marketable yields of tubers under 280 g compared with Red LaSoda and Dark Red Norland, respectively. Similarly, in 23 location-years of The Western Regional Trial in 6 western states, Winema produced 109% and 92% of marketable yields of tubers under 280 g compared with Red LaSoda and Dark Red Norland, respectively. Winema tubers are smooth-skinned with shallow eyes. Winema's bright red color does not fade appreciably in storage. Winema is susceptible to potato virus Y (PVY). Foliar symptoms of PVY are difficult to detect visually.

### INTRODUCTION

Winema was evaluated as NDO2438-6R. The clone was selected from a 1987 cross between ND1196-2R and Redsen (Johansen et al. 1984), made by R.H. Johansen at North Dakota State University, Fargo, North Dakota. The clone was initially selected at the Klamath Experiment Station at Klamath Falls, Oregon, in 1989. Early evaluations were conducted from 1990 to 1993 at Klamath Falls, Oregon, and Tulalake and Bakersfield, California. Breeders seed was produced at the Klamath Experiment Station in 1990 and subsequent increases were made at the Central Oregon Agricultural Research Center, Powell Butte, Oregon, at Stockton, California, and by private cooperators. Limited generation seed for commercial increase was produced by the Foundation Potato Seed Program at Oregon State University, Corvallis, Oregon. Winema was more widely evaluated at Oregon locations and in the Western Regional Trial in 1995, 1997, and 1998.

Winema is the name of a Modoc Indian woman who married a white settler and served as an interpreter for the U.S. Army and the Modoc Tribe during the Modoc War in 1872-1873 (Snyder 1988).

The pedigree of Winema is shown in Figure 1.

### DESCRIPTION

**Plants:** *Growth habit:* Erect, determinate. *Stems:* Closed foliage, medium anthocyanin pigmentation, weak wings. *Leaves:*

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ADDITIONAL KEY WORDS: *Solanum tuberosum*, potato cultivar, stable color.

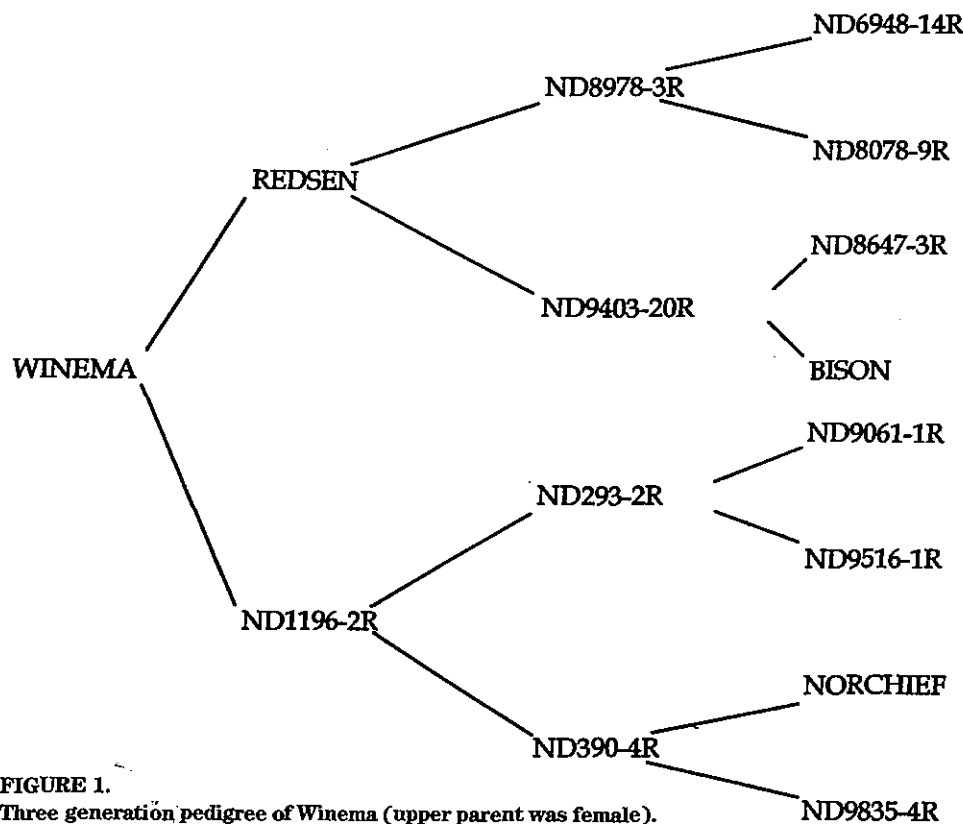


FIGURE 1.  
Three generation pedigree of Winema (upper parent was female).

to medium leaf stipules. *Terminal leaflets*: Medium ovate, acuminate tips, weak wavy margins, and cordate base. *Primary leaflets*: Five pairs per leaf; medium ovate, with acuminate tip, medium size, and cordate base. *Secondary and tertiary leaflets*: Four to eight pairs. Vine maturity is early, slightly earlier than Red LaSoda.

**Inflorescence**: Moderate (three to nine) inflorescences per plant, 12 to 24 florets per inflorescence. **Corolla**: Purple-violet with darker inner corolla, pentagonal shape. **Calyx**: Strong to very strong anthocyanin pigment. **Anthers**: Yellow-orange; broad cone-shaped; some pollen (pollen has been used successfully in crosses). **Stigma**: Capitate; olive-green. Berry production was not observed under field conditions.

**Tubers**: Skin is bright red, smooth-textured, and tuber shape is oval. The length/width/thickness

Medium green; medium pubescent; open silhouette; weak to medium anthocyanin pigment in leaf midribs and petioles; small

ratio, measured for 112 to 280 g tubers at Klamath Falls, Oregon, is approximately 1.3/1.2/1.0 compared with 1.5/1.2/1.0 for Red

TABLE 1—Yield of Winema, Red LaSoda, and Dark Red Norland at Corvallis, Oregon, Bakersfield and Tulalake, California, from 1992 to 1997.

Variety	Location	Years Tested	Yield (T/ha)					
			U.S. #1s		Total Marketable	U.S. #1s >280 g	Culls	Total Yield
			<112 g	112-280 g				
Winema	Corvallis	4	6.8	27.8	34.6	16.7	3.7	55.0
	Bakersfield	5	3.7	30.1	33.8	6.4	1.3	41.5
	Tulalake	3	1.9	28.2	30.1	19.3	1.5	50.9
Red LaSoda	Avg		4.1	28.7	32.8	14.1	2.2	48.1
	Corvallis	4	4.4	28.9	33.3	20.7	6.2	60.2
	Bakersfield	5	1.3	28.1	29.4	16.5	6.3	52.2
	Tulalake	3	0.8	24.9	32.9	26.7	7.7	67.3
Dark Red Norland	Avg		2.2	27.3	31.9	21.3	6.7	59.9
	Corvallis	4	6.0	39.4	45.4	14.8	8.0	68.2
	Bakersfield	5	2.2	35.2	37.4	8.0	4.4	49.8
	Tulalake	3	1.7	27.0	28.7	13.9	8.2	50.8
	Avg		3.3	33.9	37.2	12.2	6.9	56.3

TABLE 2—Mean yield and specific gravity of Winema, Red LaSoda, and Dark Red Norland over eight years (1993-2000) at Klamath Falls, Oregon.

Variety	Yield (T/ha)							Specific Gravity
	U.S. #1s			Total Marketable	U.S. #1s >280 g	Culls	Total Yield	
	<112 g	112-168 g	168-280 g					
Winema	4.8	11.5	17.1	33.4	19.8	3.1	56.3	1.062
Red LaSoda	4.0	8.2	16.6	28.8	24.6	11.3	64.7	1.071
Dark Red Norland	5.4	10.3	16.8	32.5	16.9	5.3	54.7	1.067
CV(%)	19	13	19	12	34	43	16	0.4
LSD (0.05)	1.0	1.4	NS	4.0	NS	3.0	NS	0.004

LaSoda and 1.5/1.3/1.0 for Dark Red Norland. Eyes are intermediate in depth and number about 15 (nine to 21) per tuber, evenly distributed. Eye brows are not prominent. Tuber flesh is white. Tuber numbers are low (fewer than eight per plant), similar to Red LaSoda and Dark Red Norland.

## CHARACTERISTICS

Winema consistently produces lower total yields than either Red LaSoda or Dark Red Norland, but similar marketable yields, with a slightly higher percentage of small tubers and significantly fewer culls (Tables 1, 2, 3). In eight replicated trials at Klamath Falls, Oregon, from 1993 through 2000, Winema yields of U.S. #1s under 280 g averaged 119% and 106% of Red LaSoda and Dark Red Norland, respectively (Table 2). In 24 Western

Regional Trials in six states in 1995, 1997, and 1998, Winema yields of U.S. #1s under 280 g averaged 109% and 92% of Red LaSoda and Dark Red Norland, respectively. Winema consistently produces low percentages of cull tubers (Tables 1, 2, 3).

Specific gravities in the Western Regional Trial averaged 1.065, 1.071, and 1.069 for Winema, Red LaSoda, and Dark Red Norland,

respectively (Table 4). Similar trends were observed in eight trials at Klamath Falls (Table 2). Winema is similar to Red LaSoda and Dark Red Norland in protein content, and percent sucrose, and slightly lower in vitamin C and total glycoalkaloids (Table 5).

## RESISTANCE TO DISEASE AND PHYSIOLOGICAL DISORDERS

Comparisons of greenhouse post-harvest tests on seed lots produced at the Central Oregon Agricultural Research Center show Winema is more susceptible to potato virus Y (PVY) than Dark Red Norland and Red LaSoda. Current-season PVY infection in Winema is difficult to detect visually. Winema is susceptible to most fungal diseases and to corky ringspot caused by tobacco rattle virus. Moderate susceptibility to Fusarium dry rot

TABLE 3—Yield of Winema, Red LaSoda, and Dark Red Norland in the Western Regional Trial in six states<sup>1</sup> in 1995, 1997, and 1998.

		Yield (T/ha)					
Variety	Year	U.S. #1s		Total Marketable	U.S. #1s >280 g	Culls	Total Yield
		<112 g	112-280 g				
Winema	1995	6.5	20.4	26.9	7.8	1.6	36.3
	1997	5.9	19.0	24.9	11.5	1.5	37.9
	1998	6.6	22.9	29.5	8.5	2.6	40.6
	Avg	6.3	20.8	27.1	9.3	1.9	38.3
Red LaSoda	1995	3.7	24.0	27.7	17.9	4.7	50.3
	1997	3.8	21.4	25.2	16.0	6.7	47.9
	1998	3.6	18.0	21.6	11.9	8.8	42.3
	Avg	3.7	21.1	24.8	15.3	6.7	46.8
Dark Red Norland	1995	5.7	24.2	29.9	9.7	5.4	45.0
	1997	5.2	23.1	28.3	9.7	5.6	43.6
	1998	4.9	24.9	29.8	10.8	5.3	45.9
	Avg	5.3	24.1	29.3	10.1	5.4	44.8

<sup>1</sup>Locations: California, Colorado, Idaho, Oregon, Texas, Washington.

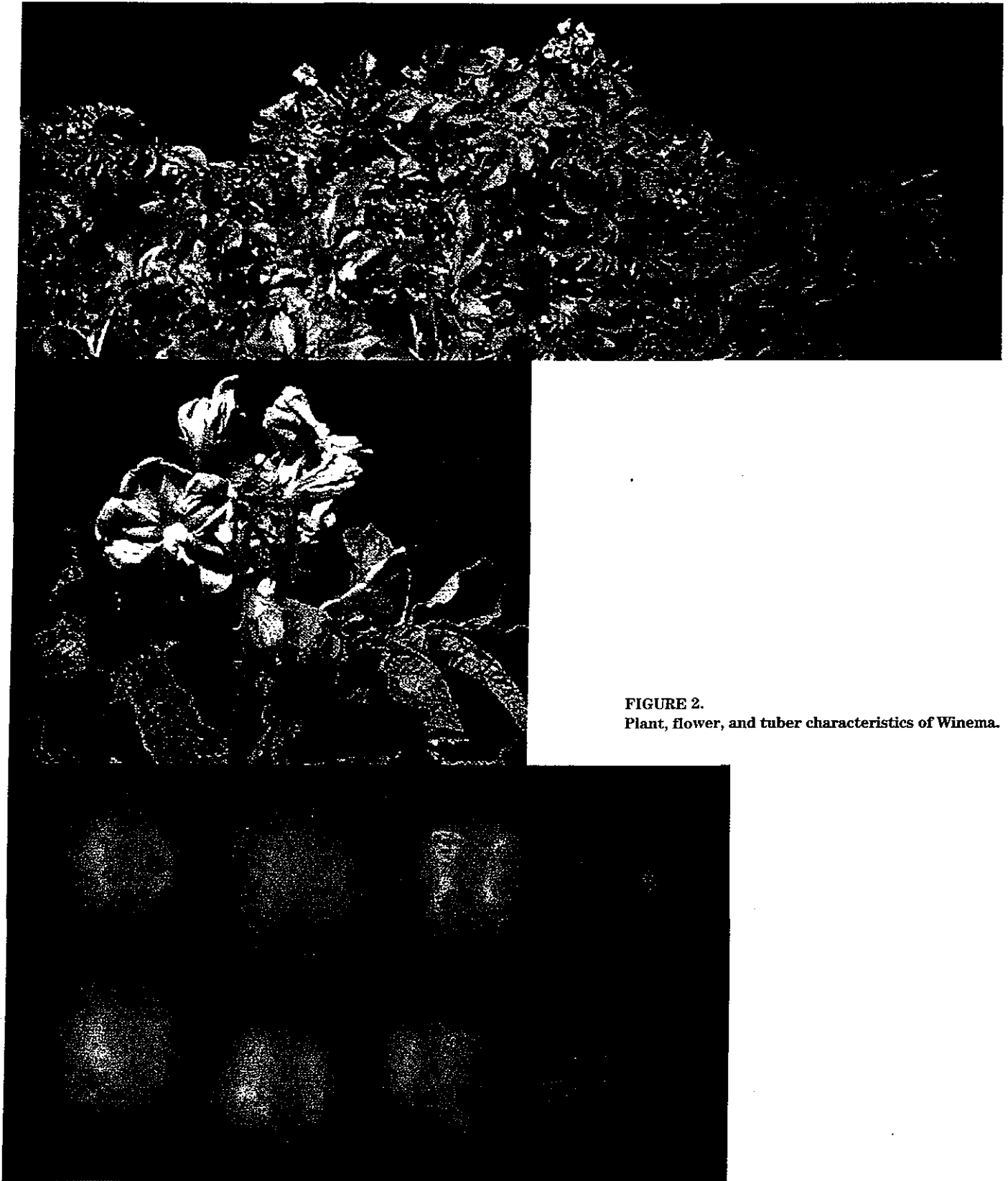


FIGURE 2.  
Plant, flower, and tuber characteristics of Winema.

TABLE 4—Physiological defects and morphological characteristics of Winema, Red LaSoda, and Dark Red Norland in the Western Regional Trial<sup>1</sup> in 1995, 1997, and 1998.

Variety	% HH & BC <sup>2</sup>	Growth Cracks <sup>3</sup>	Skinning	Vine Vigor <sup>4</sup>	Vine Mat. <sup>5</sup>	Tuber Shape <sup>6</sup>	Skin Color <sup>7</sup>	Eye Depth <sup>8</sup>	Specific Gravity
Winema	3	4.9	3.8	3.4	2.3	1.5	3.8	3.6	1.065
Red LaSoda	6	3.3	3.4	3.5	2.7	2.1	2.3	1.9	1.071
Dark Red Norland	4	3.5	3.7	3.2	2.9	2.4	2.9	3.4	1.069

<sup>1</sup>Locations: California, Colorado, Idaho, Oregon, Texas, Washington.<sup>2</sup>HH = hollow heart; BC = brown center.<sup>3</sup>Scale: 1 = severe; 5 = none.<sup>4</sup>Scale: 1 = small, weak; 5 = large, robust.<sup>5</sup>Scale: 1 = early; 5 = late.<sup>6</sup>Scale: 1 = round; 2 = oval; 3 = oblong.<sup>7</sup>Scale: 1 = pale; 5 = dark red.<sup>8</sup>Scale: 1 = deep; 5 = shallow.

has been observed in seed lots at Powell Butte, Oregon, and Stockton, California. In limited testing at Corvallis, Oregon, Winema showed much less foliar and tuber late blight infection (*Phytophthora infestans*) than most selections included in the trial. This is thought to be due to mature vines in Winema at the time of infection. Foliar symptoms of bacterial ringrot are less clearly expressed by Winema than by Red LaSoda. Tuber symptoms were similar but mild in both cultivars. Early maturity may suppress symptom expression in both cultivars.

Winema tubers seldom exhibit internal or external defects. In three years of evaluation in the Western Regional Trial, less hollow heart and brown center was observed in Winema than in Red LaSoda (Table 4). Winema tubers are not susceptible to growth cracks or shape defects. Vascular discoloration has not been identified as a concern at any location where Winema has been evaluated. Winema consistently received high ratings for skin color and eye depth. Winema tubers are less susceptible to skinning damage at harvest than Red LaSoda.

TABLE 5—Relative tuber composition of Winema, Red LaSoda, and Dark Red Norland grown at Aberdeen, Idaho,<sup>1</sup> in 1997-1998.

Variety	% Oven Dried Solids	% (Fresh weight basis)			mg/100g (Fresh weight basis)	
		Dextrose	Sucrose	Protein	Vitamin C	Total Glycoalkaloids
Winema	16.1	0.01	0.18	6.7	23.6	2.6
Red LaSoda	17.3	0.08	0.19	6.7	29.3	3.2
Dark Red Norland	17.0	0.05	0.19	6.4	28.4	3.3

<sup>1</sup>Courtesy S. Love, University of Idaho.

## USAGE

Winema is a fresh market cultivar. Preliminary culinary evaluations at Klamath Falls failed to detect after-cooking darkening, sloughing, or off-flavors in Winema. An attractive appearance, uniform tuber size distribution, bright red skin color that does not fade appreciably in storage, and early maturity favor acceptance of Winema. Certified seed of Winema is very limited. Limited quantities of *in vitro* plantlets and prenu-clear seed stocks are available by request from the Oregon Foundation Potato Seed Program at Oregon State University. Application for plant variety protection has been made for Winema.

## ACKNOWLEDGMENTS

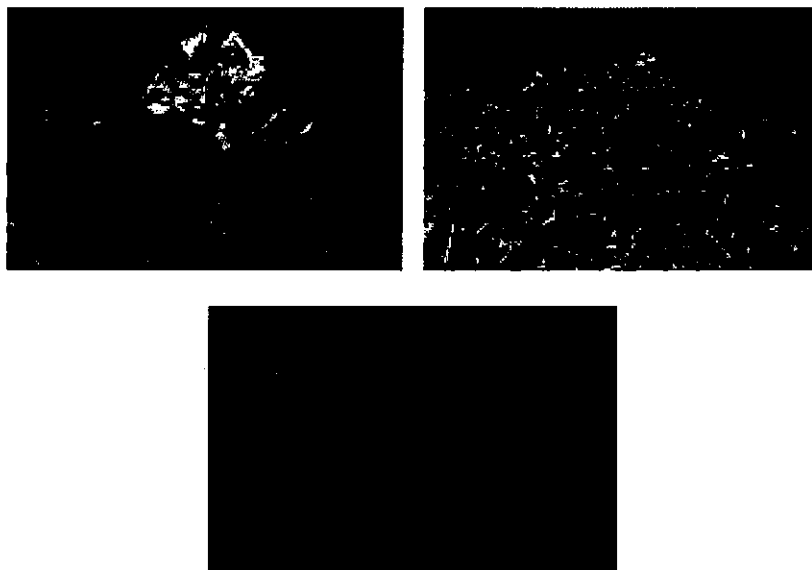
The assistance of Oscar Gutbrod in evaluation of bacterial ringrot response, and Solomon Yilma in production of *in vitro* plantlets and prenu-clear seed stocks is gratefully recognized. Partial financial support of this research was provided by the Oregon Agricultural Experiment Station, the Oregon Potato Commission, the USDA Cooperative Research, Education, and Extension Service, and the USDA Agricultural Research Service.

## LITERATURE CITED

- Johansen, R.H., B. Farnsworth, G.A. Secor, D. Hann, D.C. Nelson, P.H. Orr, and A.A. Boe. 1984. Redsen: A new bright red-skinned potato cultivar. *Am Potato J* 61:549-556.
- Snyder, W.S.. 1988. Klamath History Notes. Reprinted from *Herald and News*, Klamath Falls, OR.

**WINEMA (NDO2438-6R)**

**A. Mosley, D. Hane, S. James, K. Rykbost, C. Shock, F. Boullester, B. Charlton,  
E. Eldredge and S. Yilma**



Oregon released WINEMA in cooperation with the North Dakota, California, Idaho, and Washington Agricultural Experiment Stations in 2000. Winema is an early maturing, round to oval, red-skinned clone suitable for table use.

Winema, tested as NDO2438-6R, was selected in 1989 at Klamath Falls, Oregon from a cross between Redsen and 1196-2R performed by Dr. Robert Johansen of North Dakota State University at Fargo in 1987. Early selection and evaluations were done in trials at Klamath Falls, Oregon and Tulelake and Bakersfield, California from 1990 to 1993. Initially, seed was multiplied at the Klamath Experiment Station, with subsequent seed increases at the Central Oregon Agricultural Research Center and by private cooperators. Winema was widely evaluated in Western Regional red-skinned trials in six states in 1995, 1997, and 1998.

Winema produces lower total yields than Red LaSoda and Dark Red Norland but similar marketable yields with a higher percentage of

small, high-value tubers, and significantly fewer culls (Tables 1 and 4). Winema tubers are round to oval, seldom exhibit growth cracks or rough shape common to Red LaSoda and Dark Red Norland, produce uniform bright skin color that does not fade in storage, and have shallow eyes compared to Red LaSoda (Table 2).

Winema tubers have lower specific gravity than Dark Red Norland and Red LaSoda (Tables 1 and 4). Internal defects, including hollow heart and brown center, and external growth cracks seldom occur in Winema. Protein content, percent sucrose, and total glycoalkaloids are similar for Winema, Red LaSoda, and Dark Red Norland, but Winema is lower in vitamin C (Table 3). Preliminary culinary evaluations at Klamath Falls failed to detect after-cooking darkening, off-flavor, or sloughing problems.

Winema vines mature slightly earlier than Red LaSoda. Vines are sensitive to metribuzin injury. Winema is very susceptible to potato virus Y and foliar PVY symptoms are very difficult to detect

visually. Winema is susceptible to most fungal diseases. In limited testing at Corvallis, Oregon, Winema experienced much less foliar and tuber late blight infection than most selections included in the trial. This was thought to be due to mature vines in Winema at the time of infection. Winema is susceptible to corky ringspot caused by tobacco rattle virus. Moderate susceptibility to fusarium dry rot has been observed in seed lots at Powell Butte, Oregon and Stockton, California.

Certified seed of Winema is available from seed growers in California and Oregon. Limited quantities of *invitro* and greenhouse stocks can be ordered from the Foundation Potato Seed Program (Phone 541-737-5838) at Oregon State University. WINEMA will be protected through the Plant Variety Protection (PVP) Act.

**Table 1. Yield and quality characteristics of NDO2438-6R, Red LaSoda, and Dk. Red Norland in Western Regional Trials, 1995, 1997, 1998<sup>1</sup>.**

Entry	Yield cwt/a						% Marketable <sup>2</sup>	Oz/Tuber	Spec. Grav.
	Total	<4 oz	US No. 1 4-10 oz	Total Marketable <sup>2</sup>	US No. 1 >10 oz	Culls			
NDO2438-6R	338	57	178	235	83	17	70	4.5	1.065
Red LaSoda	421	33	189	222	136	60	53	6.2	1.071
Dk. Red Norland	398	47	223	270	90	48	68	5.5	1.069

<sup>1</sup> Locations: California, Colorado, Idaho, Oregon, Texas, Washington

<sup>2</sup> Yield < 4 oz. -  $\leq$  10 oz.



**Table 2. Physiological defects and Morphological characteristics of NDO2438-6R, Red LaSoda, & Dk. Red Norland in Western Regional Trials, 1995, 1997, 1998<sup>1</sup>.**

Entry	% HH & BC <sup>2</sup>	Growth Cracks <sup>3</sup>	Skinning <sup>4</sup>	Vine Vigor <sup>5</sup>	Vine Mat. <sup>6</sup>	Tuber Shape <sup>7</sup>	Skin Color <sup>8</sup>	Eye Depth <sup>9</sup>
NDO2438-6R	3	4.9	3.8	3.4	2.3	1.5	3.8	3.6
Red LaSoda	6	3.3	3.4	3.5	2.7	2.1	2.3	1.9
Dk. Red Norland	4	3.5	3.7	3.2	2.9	2.4	2.9	3.4

<sup>1</sup> Locations: California, Colorado, Idaho, Oregon, Texas, Washington<sup>2</sup> HH = Hollow Heart; BC = Brown Center<sup>3</sup> Growth Cracks: 1 = Severe; 5 = None<sup>4</sup> Skinning: 1 = Severe; 5 = None<sup>5</sup> Vine Vigor: 1 = Weak; 5 = Strong<sup>6</sup> Vine Maturity: 1 = Early; 5 = Late<sup>7</sup> Tuber Shape: 1 = Round; 5 = Long, Narrow<sup>8</sup> Skin Color: 1 = Pale; 5 = Dk. Red<sup>9</sup> Eye Depth: 1 = Deep; 5 = Shallow

**Table 3. Relative tuber composition of NDO2438-6R, Red LaSoda, and Dk. Red Norland at Aberdeen, ID<sup>1</sup>.**

Entry	% Oven Dried Solids	% DWB			Mg/100g FWB	
		Dextrose	Sucrose	Protein	Vitamin C	Total Glycoalkaloids
NDO2438-6R	16.1	0.01	0.18	6.71	23.63	2.55
Red LaSoda	17.3	0.08	0.19	6.66	29.34	3.20
Dk. Red Norland	17.0	0.05	0.19	6.37	28.38	3.32

<sup>1</sup> 1997 - 1998 courtesy Dr. Dennis Corsini, ARS/USDA**Table 4. Yield and quality characteristics of NDO2438-6R, Red LaSoda, and Dk. Red Norland in Oregon and California Trials 1992 - 1998<sup>1</sup>.**

Entry	Location	Years	Yield cwt/a						% Marketable <sup>2</sup>	Spec. Grav.
			Total	<4 oz	US No. 1 4-10 oz	Total Marketable <sup>2</sup>	US No. 1 >10 oz	Culls		
NDO2438-6R	Corvallis	4	489	61	248	309	149	33	63	1.062
	Klamath Falls	6	490	47	261	308	157	26	63	1.063
	Bakersfield	5	370	33	269	302	57	12	82	1.071
	Tulelake	3	454	17	252	269	172	13	59	1.075
	AVG.		451	40	258	297	134	21	67	1.068
Red LaSoda	Corvallis	4	537	39	258	297	185	55	55	1.072
	Klamath Falls	6	582	37	238	275	213	95	47	1.073
	Bakersfield	5	466	12	251	263	147	56	56	1.078
	Tulelake	3	536	7	222	229	238	69	43	1.077
	AVG.		530	24	242	266	196	69	50	1.075
Dk. Red Norland	Corvallis	4	609	54	352	406	132	71	67	1.074
	Klamath Falls	6	443	56	234	290	107	47	65	1.067
	Bakersfield	4	444	20	314	334	71	39	75	1.073
	Tulelake	2	451	15	241	256	124	73	57	1.075
	AVG.		487	36	285	322	109	58	66	1.072

<sup>1</sup> Locations: Corvallis and Klamath Falls (Oregon); Bakersfield and Tulelake (California).<sup>2</sup> Yield < 4 oz. - ≤ 10 oz.

Winema, tested as NDO2438-6R, was selected in 1989 at Klamath Falls, Oregon from a cross between Redsen and 1196-2R performed by Dr. Robert Johansen of North Dakota State University, at Fargo in 1987.

Developers: Oregon, North Dakota, California, Idaho and Washington Agricultural Experiment Stations.

Winema consistently produces similar marketable yields but lower total yields than either Red LaSoda or Dark Red Norland. Winema tubers have bright red skin color that does not fade in storage. Winema is suitable for table use.

**Strengths:** good marketable yield, bright red skin color, shallow eyes, few internal and external defects, and excellent appearance.

**Weaknesses:** foliar PVY symptoms are difficult to detect visually, susceptible to most fungal diseases and to corky ringspot.

**Incentives for Production:** attractive tuber type, high percentage of marketable tubers, bright red skin color with shallow eyes, and excellent pack-out.



## Compared to Red LaSoda

Marketable Yield	0
Grade	++
Skin Color	+++
Storability	0
External Defects	+++
Internal Defects	+++
Eye Depth	++

+ = better, 0 = same, - = worse

## Agronomic Characteristics

Maturity	Early
Tubers	Round to oval, bright red skin, and smooth
Marketable Yield	Medium (250 cwt./acre)
Specific Gravity	Low (1.064)
Culinary Quality	Good, occasional sloughing when boiled
Diseases	MS to fusarium dry rot, S to most fungal diseases and corky ring spot.
Storability	Similar dormancy to other red varieties, skin color does not fade in storage

MS = moderately susceptible, S = susceptible

	Total	Yield U.S. No. 1's			Yield		%	Specific Gravity
	Yield	<4 oz	4-10 oz	Marketable¹	>10 oz	Culls	Marketable¹	
Idaho²								
Winema	293	63	156	219	65	9	75	1.063
Red LaSoda	383	37	168	205	147	31	54	1.068
Dk. Red Norland	372	68	193	261	76	35	70	1.066
Oregon³								
Winema	437	57	217	274	133	30	63	1.063
Red LaSoda	499	37	217	254	156	89	51	1.074
Dk. Red Norland	509	51	256	307	125	77	60	1.074
Washington⁴								
Winema	367	91	174	265	74	28	72	1.065
Red LaSoda	389	48	176	224	108	57	58	1.064
Dk. Red Norland	367	66	180	246	67	54	67	1.065

<sup>1</sup> < 4 oz - 10 oz. U.S. No. 1's

<sup>2</sup> 3 trials grown in Idaho, 1995, 1997, 1998, at Aberdeen and Kimberly

<sup>3</sup> 6 trials grown in Oregon, 1995, 1997, 1998, at Corvallis and Klamath Falls

<sup>4</sup> 3 trials grown in Washington, 1995, 1997, 1998, at Ellensburg, Toppenish, Granger

For full-text descriptions and additional data visit <http://oregonstate.edu/potatoes/Winema.PDF>

**Exhibit D – Additional Description of Variety**

**Table 1. Yield and quality characteristics of NDO2438-6R, Red LaSoda, and Dk. Red Norland in Western Regional Trials, 1995, 1997, 1998<sup>1</sup>.**

Entry	Yield cwt/a						% Marketable <sup>2</sup>	Oz/ Tuber	Spec. Grav.
	Total	<4 oz	US No. 1 4-10 oz	Total Marketable <sup>2</sup>	US No. 1 >10 oz	Culls			
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Red LaSoda	421	33	189	222	136	60	53	6.2	1.071
Dk. Red Norland	398	47	223	270	90	48	68	5.5	1.069

<sup>1</sup> Locations: California, Colorado, Idaho, Oregon, Texas, Washington

<sup>2</sup> Yield < 4 oz. - ≤ 10 oz.

**Table 2. Physiological defects and Morphological characteristics of NDO2438-6R, Red LaSoda, & Dk. Red Norland in Western Regional Trials, 1995, 1997, 1998<sup>1</sup>.**

Entry	% HH & BC <sup>2</sup>	Growth Cracks <sup>3</sup>	Skinning <sup>4</sup>	Vine Vigor <sup>5</sup>	Vine Mat. <sup>6</sup>	Tuber Shape <sup>7</sup>	Skin Color <sup>8</sup>	Eye Depth <sup>9</sup>
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Red LaSoda	6	3.3	3.4	3.5	2.7	2.1	2.3	1.9
Dk. Red Norland	4	3.5	3.7	3.2	2.9	2.4	2.9	3.4

<sup>1</sup> Locations: California, Colorado, Idaho, Oregon, Texas, Washington

<sup>2</sup> HH = Hollow Heart; BC = Brown Center

<sup>3</sup> Growth Cracks: 1 = Severe; 5 = None

<sup>4</sup> Skinning: 1 = Severe; 5 = None

<sup>5</sup> Vine Vigor: 1 = Weak; 5 = Strong

<sup>6</sup> Vine Maturity: 1 = Early; 5 = Late

<sup>7</sup> Tuber Shape: 1 = Round; 5 = Long, Narrow

<sup>8</sup> Skin Color: 1 = Pale; 5 = Dk. Red

<sup>9</sup> Eye Depth: 1 = Deep; 5 = Shallow

200100093

Table 3. Relative tuber composition of NDO2438-6R, Red LaSoda, and Dk. Red Norland at Aberdeen, ID<sup>1</sup>.

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<sup>1</sup> 1997 - 1998 courtesy Dr. Dennis Corsini, ARS/USDA

Table 4. Yield and quality characteristics of NDO2438-6R, Red LaSoda, and Dk. Red Norland in Oregon and California Trials 1992 - 1998<sup>1</sup>.

Entry	Location	Years	Yield cwt/a						% Marketable <sup>2</sup>	Spec. Grav.
			Total	<4 oz	US No. 1 4-10 oz	Total Marketable <sup>2</sup>	US No. 1 >10 oz	Culls		
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Dk. Red Norland	Corvallis	4	609	54	352	406	132	71	67	1.074
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	Bakersfield	4	444	20	314	334	71	39	75	1.073
	Tulelake	2	451	15	241	256	124	73	57	1.075
	AVG.		487	36	285	322	109	58	66	1.072

<sup>1</sup> Locations: Corvallis and Klamath Falls (Oregon); Bakersfield and Tulelake (California).

<sup>2</sup> Yield < 4 oz. - ≤ 10 oz.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

**EXHIBIT E**  
**STATEMENT OF THE BASIS OF OWNERSHIP**

1. NAME OF APPLICANT(S) State of Oregon by/through STBHE acting on behalf of Oregon State University <i>LMC 7-18-07 per correspondence May 29, 2007</i>	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER: NDO2438-6R	3. VARIETY NAME:  Winema
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP and Country) <i>LMC 7-2-2007</i> Office of Technology Transfer Oregon State University 312 Kerr Administration Building Corvallis, OR 97331	5. TELEPHONE (Include area code)  541-737-0674	6. FAX (Include area code)  541-737-3093
7. PVPO NUMBER <b>#200100093</b>		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. ☒ YES ☐ NO9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☒ YES ☐ NO10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

The STATE OF OREGON, Acting by and Through the State Board of Higher Education on behalf of OREGON STATE UNIVERSITY is a partner in the Northwest (Tri-State) Potato Variety Development Program and a signatory of the General Agreement on Policy and Procedure for Release of New Publicly Developed Plant Varieties in Idaho, Oregon and Washington, between Washington State University, Oregon State University, University of Idaho and the United States of America, as represented by the Secretary of Agriculture. In accordance with provision 2.2 of this Agreement, Oregon State University is applying for this PVPC.

**PLEASE NOTE:**

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 5 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

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**U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
SCIENCE AND TECHNOLOGY  
PLANT VARIETY PROTECTION OFFICE  
BELTSVILLE, MD 20705**

**EXHIBIT F  
DECLARATION REGARDING DEPOSIT**

NAME OF OWNER (S)	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country)	TEMPORARY OR EXPERIMENTAL DESIGNATION NDO2438-6R
State of Oregon by/through STBHE acting on behalf of Oregon State University per correspondence May 29, 2007 LMC 1-2-2007	Office of Technology Transfer Oregon State University 312 Kerr Administration Building Corvallis, OR 97331 United State of America	VARIETY NAME Winema
NAME OF OWNER REPRESENTATIVE (S)	ADDRESS (Street and No. or RD No., City, State, and Zip Code and Country)	FOR OFFICIAL USE ONLY
Office of Technology Transfer c/o Sarah Mabee Oregon State University A312 Kerr Administration Bldg Corvallis, OR 97331-2140 USA	P.O. Box 5007 Portland, OR 97224 United States of America	PVPO NUMBER <b>#200100093</b>

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.

  
Signature

2/22/2007  
Date